

IN THE SPECIFICATION

Please amend the Title on page 1 to read as follows:

DIGITAL CAMERA WITH POWER SUPPLY FOR PIEZOELECTRIC ELEMENT
AND STROBOSCOPE CIRCUIT

Please amend the paragraph at page 4, lines 3-8 as follows:

A1
According to another aspect of this invention, in the digital camera according to one aspect of this invention, in which the energy accumulating means is composed of a main capacitor for ~~stroboscope~~ strobo unit emission provided inside or outside, and the piezoelectric element is charged by the energy accumulated in this main capacitor.

Please amend the paragraph at page 4, lines 9-23 as follows:

A2
According to still another aspect of this invention, a digital camera capable of taking an image by shifting pixels comprises imaging device for taking a subject image, a piezoelectric element for displacing the imaging device, switching means for charging the piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo unit emission provided inside or outside, or discharging the piezoelectric element, and control means for controlling the switching means for controlling the charging and discharging sequence of the piezoelectric element, in which the control means controls to take a first image by charging the piezoelectric element in a state of displacing the imaging device, and take a second image by discharging the piezoelectric element in a state before displacement of the imaging device.

Please amend the paragraph at page 4, line 24 to page 5, line 18 as follows:

A3
According to still another aspect of this invention, a digital camera capable of taking an image by shifting pixels comprises imaging device for taking a subject image, a piezoelectric element for displacing the imaging device, switching means for charging the piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo unit emission provided inside or outside, or discharging the piezoelectric element, and control means for controlling the switching means for controlling the charging and discharging sequence of the piezoelectric element, in which the switching means includes a charge adjusting circuit for stopping the charging operation when the charged voltage in the piezoelectric element becomes a specified value to hold this charged voltage, and restarting charging operation when the charged voltage in the piezoelectric element becomes lower than a specified value, and the control means controls to take a first image by charging the piezoelectric element in a state of displacing the imaging device, and take a second image by discharging the piezoelectric element in a state before displacement of the imaging device.

Please amend the paragraph at page 5, line 19 to page 6, line 18 as follows:

A4
Cont
According to still another aspect of this invention, a digital camera capable of taking an image by shifting pixels comprises imaging device for taking a subject image, a piezoelectric element for displacing the imaging device, switching means for charging the piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo unit emission provided inside or outside, or discharging the piezoelectric element, and control means for controlling the switching means for controlling the charging and discharging sequence of the piezoelectric element, in which the switching means includes a charging switch circuit for turning on or off charging of the piezoelectric element, a discharging switch circuit for turning on or off discharging of the piezoelectric element, a detecting circuit for

A4
cont

detecting the charged voltage in the piezoelectric element, and comparing means for comparing the charged voltage in the piezoelectric element detected by the detecting means and a reference voltage, the charging switch circuit turns on or off charging of the piezoelectric element on the basis of the result of comparison by the comparing means, and the control means controls to take a first image by charging the piezoelectric element in a state of displacing the imaging device, and take a second image by discharging the piezoelectric element in a state before displacement of the imaging device.

Please amend the paragraph at page 6, line 19 to page 7, line 9 as follows:

A5

According to still another aspect of this invention, a digital camera capable of taking an image by shifting pixels comprises imaging device for taking a subject image, a piezoelectric element for displacing the imaging device, switching means for charging the piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo unit emission provided inside or outside, or discharging the piezoelectric element, and control means for controlling the switching means for controlling the charging and discharging sequence of the piezoelectric element, in which the control means controls so as to stop the charging operation when the piezoelectric element reaches a specified voltage, and to take a first image by charging the piezoelectric element in a state of displacing the imaging device, and take a second image by discharging the piezoelectric element in a state before displacement of the imaging device.

Please amend the paragraph at page 7, line 10 to page 8, line 8 as follows:

A6
cont

According to still another aspect of this invention, a digital camera capable of taking an image by shifting pixels comprises imaging device for taking a subject image, a piezoelectric element for displacing the imaging device, switching means for charging the

piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo
unit emission provided inside or outside, or discharging the piezoelectric element, and control
means for controlling the switching means for controlling the charging and discharging
sequence of the piezoelectric element, and also controlling to stop the charging operation
when the piezoelectric element reaches a specified voltage, in which the switching means
includes a charging switch circuit for turning on or off charging of the piezoelectric element,
a discharging switch circuit for turning on or off discharging of the piezoelectric element, and
a detecting circuit for detecting the charged voltage in the piezoelectric element, and the
control means controls to turn on or off the charging switch circuit on the basis of the
detected voltage of the detecting circuit, and to take a first image by charging the
piezoelectric element in a state of displacing the imaging device, and take a second image by
discharging the piezoelectric element in a state before displacement of the imaging device.

Please amend the paragraph at page 8, lines 9-22 as follows:

According to still another aspect of this invention, a digital camera capable of taking
an image by shifting pixels comprises imaging device for taking a subject image, a
piezoelectric element for displacing the imaging device, switching means for charging the
piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo
unit emission provided inside or outside, or discharging the piezoelectric element, and control
means for controlling the switching means for controlling the charging and discharging
sequence of the piezoelectric element, in which the control means controls to take a first
image in a state not displacing the imaging device, and take a second image by charging the
piezoelectric element in a state of displacing the imaging device.

Please amend the paragraph at page 8, line 23 to page 9, line 16 as follows:

28
According to still another aspect of this invention, a digital camera capable of taking an image by shifting pixels comprises imaging device for taking a subject image, a piezoelectric element for displacing the imaging device, switching means for charging the piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo unit emission provided inside or outside, or discharging the piezoelectric element, and control means for controlling the switching means for controlling the charging and discharging sequence of the piezoelectric element, in which the switching means includes a charge adjusting circuit for stopping the charging operation when the charged voltage in the piezoelectric element becomes a specified value to hold this charged voltage, and restarting charging operation when the charged voltage in the piezoelectric element becomes lower than a specified value, and the control means controls to take a first image in a state not displacing the imaging device, and take a second image by charging the piezoelectric element in a state of displacing the imaging device.

Please amend the paragraph at page 9, line 17 to page 10, line 15 as follows:

29
According to still another aspect of this invention, a digital camera capable of taking an image by shifting pixels comprises imaging device for taking a subject image, a piezoelectric element for displacing the imaging device, switching means for charging the piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo unit emission provided inside or outside, or discharging the piezoelectric element, and control means for controlling the switching means for controlling the charging and discharging sequence of the piezoelectric element, in which the switching means includes a charging switch circuit for turning on or off charging of the piezoelectric element, a discharging switch circuit for turning on or off discharging of the piezoelectric element, a detecting circuit for

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cont

detecting the charged voltage in the piezoelectric element, and comparing means for comparing the charged voltage in the piezoelectric element detected by the detecting means and a reference voltage, the charging switch circuit turns on or off charging of the piezoelectric element on the basis of the result of comparison by the comparing means, and the control means controls to take a first image in a state not displacing the imaging device, and take a second image by charging the piezoelectric element in a state of displacing the imaging device.

Please amend the paragraph at page 10, line 16 to page 11, line 5 as follows:

an

According to still another aspect of this invention, a digital camera capable of taking an image by shifting pixels comprises imaging device for taking a subject image, a piezoelectric element for displacing the imaging device, switching means for charging the piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo unit emission provided inside or outside, or discharging the piezoelectric element, and control means for controlling the switching means for controlling the charging and discharging sequence of the piezoelectric element, in which the control means controls so as to stop the charging operation when the piezoelectric element reaches a specified voltage, and to take a first image in a state not displacing the imaging device, and take a second image by charging the piezoelectric element in a state of displacing the imaging device.

Please amend the paragraph at page 11, line 6 to page 12, line 3 as follows:

a 11
cont

According to still another aspect of this invention, a digital camera capable of taking an image by shifting pixels comprises imaging device for taking a subject image, a piezoelectric element for displacing the imaging device, switching means for charging the piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo

A11
Cont
unit emission provided inside or outside, or discharging the piezoelectric element, and control means for controlling the switching means for controlling the charging and discharging sequence of the piezoelectric element, and also controlling to stop the charging operation when the piezoelectric element reaches a specified voltage, in which the switching means includes a charging switch circuit for turning on or off charging of the piezoelectric element, a discharging switch circuit for turning on or off discharging of the piezoelectric element, and a detecting circuit for detecting the charged voltage in the piezoelectric element, and the control means controls to turn on or off the charging switch circuit on the basis of the detected voltage of the detecting circuit, and to take a first image in a state not displacing the imaging device, and take a second image by charging the piezoelectric element in a state of displacing the imaging device.

Please replace the paragraph at page 15, lines 2-9 as follows:

A12
Cont
The system controller 30 is coupled to the units of the imaging unit 21 of the imaging block 2, ~~stroboscope~~ strobo unit circuit 4, A/D converter 5, sensor data output unit 31, memory group 32, pixel shifting processing unit 33, piezoelectric element charging circuit 6, and signal generator 7, and controls the operation depending on the imaging operation, stroboscope emission operation, A/D conversion, read/write of memory, pixel shifting, and key input.

Please amend the paragraph at page 16, lines 11-17 as follows:

A13
Cont
The ~~stroboscope~~ strobo unit circuit 4 is a circuit for ~~emit~~ emitting a stroboscope by the control of the system controller 30, and comprises a ~~stroboscope~~ strobo unit emission circuit 41 having reflector and discharge tube for ~~stroboscope~~ strobo unit emission, a main capacitor

a13
dend
42 for supplying energy to the ~~stroboscope~~ strobo unit emission circuit 41, a main capacitor charging circuit 43 for charging the main capacitor 42, and others.

Please amend the paragraph at page 16, lines 18-22 as follows:

a14
The piezoelectric element charging circuit 6 charges the piezoelectric element 24 of the imaging unit 21 by using the main capacitor 42 of the ~~stroboscope~~ strobo unit circuit 4 as secondary power source, by the control of the system controller 30.

Please amend the paragraph at page 26, lines 11-15 as follows:

a15
As explained herein, since the main capacitor 42 for ~~stroboscope~~ strobo unit emission is used as the electric power supply source for the piezoelectric element 24, without particularly preparing the boosting circuit in the digital camera, the piezoelectric element can be operated.

Please amend the paragraph at page 26, line 16 to page 27, line 1 as follows:

a16
In the piezoelectric element charging circuit 6 shown in Fig. 5 and Fig. 7, at the time of taking images by shifting pixels, the piezoelectric element 24 is charged by the energy accumulated in the main capacitor 42 for ~~stroboscope~~ strobo unit emission, or the piezoelectric element 24 is discharged, and the system controller 30 controls the piezoelectric element charging circuit 6, and controls the charging and discharging sequence of the piezoelectric element 24, and therefore the piezoelectric element can be operated without particularly preparing the boosting circuit in the digital camera, and an image of high definition is obtained.

Please amend the paragraph at page 31, lines 14-20 as follows:

Q17 The invention is not limited to the illustrated embodiment alone, but may be changed or modified within a range not departing from the true spirit of the invention. For example, in the embodiment, the internal ~~stroboscope~~ strobo unit type (the ~~stroboscope~~ strobo unit circuit 4 in Fig. 1) is explained, but the invention can be similarly applied in the case of using an external type ~~stroboscope~~ strobo unit device.

Please amend the paragraph at page 32, lines 4-11 as follows:

Q18 According to the invention as set forth in another aspect, relating to one aspect, the energy accumulating means is composed of a main capacitor for ~~stroboscope~~ strobo unit emission provided inside or outside, and the piezoelectric element is charged by the energy accumulated in this main capacitor, and therefore in addition to the effects of one aspect, the piezoelectric element can be operated by the main capacitor for ~~stroboscope~~ strobo unit emission.

Please amend the paragraph at page 32, line 12 to page 33, line 3 as follows:

Q19
Cont According to the invention as set forth in still another aspect, the imaging device takes a subject image, the piezoelectric element displaces the imaging device, the switching means charges the piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo unit emission provided inside or outside, or discharges the piezoelectric element, and the control means controls the switching means for controlling the charging and discharging sequence of the piezoelectric element, whereas the control means controls to take a first image by charging the piezoelectric element in a state of displacing the imaging device, and take a second image by discharging the piezoelectric element in a state before displacement of the imaging device, and therefore the piezoelectric element can be operated

A19
amend
without particularly preparing boosting circuit in the digital camera, and also an image of high definition can be obtained.

Please amend the paragraph at page 33, line 4 to page 34, line 2 as follows:

A20
According to the invention as set forth in still another aspect, the imaging device takes a subject image, a piezoelectric element displaces the imaging device, switching means charges the piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo unit emission provided inside or outside, or discharges the piezoelectric element, and the control means controls the switching means for controlling the charging and discharging sequence of the piezoelectric element, whereas the switching means includes a charge adjusting circuit for stopping the charging operation when the charged voltage in the piezoelectric element becomes a specified value to hold this charged voltage, and restarting charging operation when the charged voltage in the piezoelectric element becomes lower than a specified value, and the control means controls to take a first image by charging the piezoelectric element in a state of displacing the imaging device, and take a second image by discharging the piezoelectric element in a state before displacement of the imaging device, and therefore the piezoelectric element can be operated without particularly preparing boosting circuit in the digital camera, and also an image of high definition can be obtained. Moreover, since the charging end is controlled by the switching means, the load of the control means is lessened.

Please amend the paragraph at page 34, line 3 to page 35, line 6 as follows:

A21
Cont
According to the invention as set forth in still another aspect, the imaging device takes a subject image, the piezoelectric element displaces the imaging device, the switching means charges the piezoelectric element by the energy accumulated in a main capacitor for

A21
cancel

~~stroboscope~~ strobo unit emission provided inside or outside, or discharges the piezoelectric element, and the control means controls the switching means for controlling the charging and discharging sequence of the piezoelectric element, whereas the switching means includes a charging switch circuit for turning on or off charging of the piezoelectric element, a discharging switch circuit for turning on or off discharging of the piezoelectric element, a detecting circuit for detecting the charged voltage in the piezoelectric element, and comparing means for comparing the charged voltage in the piezoelectric element detected by the detecting means and a reference voltage, the charging switch circuit turns on or off charging of the piezoelectric element on the basis of the result of comparison by the comparing means, and the control means controls to take a first image by charging the piezoelectric element in a state of displacing the imaging device, and take a second image by discharging the piezoelectric element in a state before displacement of the imaging device, and therefore the piezoelectric element can be operated without particularly preparing boosting circuit in the digital camera, and also an image of high definition can be obtained. Moreover, since the charging end is controlled by the comparing means of the switching means, the load of the control means is lessened.

Please amend the paragraph at page 35, line 7 to page 36, line 1 as follows:

A22
cancel

According to the invention as set forth in still another aspect, the imaging device takes a subject image, the piezoelectric element displaces the imaging device, the switching means charges the piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo unit emission provided inside or outside, or discharges the piezoelectric element, and the control means controls the switching means for controlling the charging and discharging sequence of the piezoelectric element, whereas the control means controls so as to stop the charging operation when the piezoelectric element reaches a specified voltage, and

A23
Cont

to take a first image by charging the piezoelectric element in a state of displacing the imaging device, and take a second image by discharging the piezoelectric element in a state before displacement of the imaging device, and therefore the piezoelectric element can be operated without particularly preparing boosting circuit in the digital camera, and also an image of high definition can be obtained. Moreover, since the charging end is controlled by the control means, the switching means is realized in a smaller circuit structure.

Please amend the paragraph at page 36, line 2 to page 37, line 4 as follows:

A23
Cont

According to the invention as set forth in still another aspect, the imaging device takes a subject image, the piezoelectric element displaces the imaging device, the switching means charges the piezoelectric element by the energy accumulated in a main capacitor for stroboscope strobo unit emission provided inside or outside, or discharges the piezoelectric element, and the control means controls the switching means for controlling the charging and discharging sequence of the piezoelectric element, and also controls to stop the charging operation when the piezoelectric element reaches a specified voltage, whereas the switching means includes a charging switch circuit for turning on or off charging of the piezoelectric element, a discharging switch circuit for turning on or off discharging of the piezoelectric element, and a detecting circuit for detecting the charged voltage in the piezoelectric element, and the control means controls to turn on or off the charging switch circuit on the basis of the detected voltage of the detecting circuit, and to take a first image by charging the piezoelectric element in a state of displacing the imaging device, and take a second image by discharging the piezoelectric element in a state before displacement of the imaging device, and therefore the piezoelectric element can be operated without particularly preparing boosting circuit in the digital camera, and also an image of high definition can be obtained.

Moreover, since the charging end is controlled by the control means, the switching means is realized in a smaller circuit structure.

A23
cont

Please amend the paragraph at page 37, lines 5-20 as follows:

A24

According to the invention as set forth in still another aspect, the imaging device takes a subject image, the piezoelectric element displaces the imaging device, the switching means charges the piezoelectric element by the energy accumulated in a main capacitor for stroboscope strobo unit emission provided inside or outside, or discharges the piezoelectric element, and the control means controls the switching means for controlling the charging and discharging sequence of the piezoelectric element, whereas the control means controls to take a first image in a state not displacing the imaging device, and take a second image by charging the piezoelectric element in a state of displacing the imaging device, and therefore the piezoelectric element can be operated without particularly preparing boosting circuit in the digital camera, and also an image of high definition can be obtained.

Please amend the paragraph at page 37, line 21 to page 38, line 18 as follows:

A25
cont

According to the invention as set forth in still another aspect, the imaging device takes a subject image, the piezoelectric element displaces the imaging device, the switching means charges the piezoelectric element by the energy accumulated in a main capacitor for stroboscope strobo unit emission provided inside or outside, or discharges the piezoelectric element, and the control means controls the switching means for controlling the charging and discharging sequence of the piezoelectric element, whereas the switching means includes a charge adjusting circuit for stopping the charging operation when the charged voltage in the piezoelectric element becomes a specified value to hold this charged voltage, and restarting charging operation when the charged voltage in the piezoelectric element becomes lower than

a25
end

a specified value, and the control means controls to take a first image in a state not displacing the imaging device, and take a second image by charging the piezoelectric element in a state of displacing the imaging device, and therefore the piezoelectric element can be operated without particularly preparing boosting circuit in the digital camera, and also an image of high definition can be obtained. Moreover, since the charging end is controlled by the switching means, the load of the control means is lessened.

Please amend the paragraph at page 38, line 19 to page 39, line 21 as follows:

a26
Cont

According to the invention as set forth in still another aspect, the imaging device takes a subject image, the piezoelectric element displaces the imaging device, the switching means charges the piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo unit emission provided inside or outside, or discharges the piezoelectric element, and the control means controls the switching means for controlling the charging and discharging sequence of the piezoelectric element, whereas the switching means includes a charging switch circuit for turning on or off charging of the piezoelectric element, a discharging switch circuit for turning on or off discharging of the piezoelectric element, a detecting circuit for detecting the charged voltage in the piezoelectric element, and comparing means for comparing the charged voltage in the piezoelectric element detected by the detecting means and a reference voltage, the charging switch circuit turns on or off charging of the piezoelectric element on the basis of the result of comparison by the comparing means, and the control means controls to take a first image in a state not displacing the imaging device, and take a second image by charging the piezoelectric element in a state of displacing the imaging device, and therefore the piezoelectric element can be operated without particularly preparing boosting circuit in the digital camera, and also an

A26
Amend image of high definition can be obtained. Moreover, since the charging end is controlled by the comparing means of the switching means, the load of the control means is lessened.

Please amend the paragraph at page 39, line 22 to page 40, line 16 as follows:

A27
Amend According to the invention as set forth in still another aspect, the imaging device takes a subject image, the piezoelectric element displaces the imaging device, the switching means charges the piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo unit emission provided inside or outside, or discharges the piezoelectric element, and the control means controls the switching means for controlling the charging and discharging sequence of the piezoelectric element, whereas the control means controls so as to stop the charging operation when the piezoelectric element reaches a specified voltage, and to take a first image in a state not displacing the imaging device, and take a second image by charging the piezoelectric element in a state of displacing the imaging device, and therefore the piezoelectric element can be operated without particularly preparing boosting circuit in the digital camera, and also an image of high definition can be obtained. Moreover, since the charging end is controlled by the control means, the switching means is realized in a smaller circuit structure.

Please amend the paragraph at page 40, line 17 to page 41, line 18 as follows:

A28
Amend According to the invention as set forth in still another aspect, the imaging device takes a subject image, the piezoelectric element displaces the imaging device, the switching means charges the piezoelectric element by the energy accumulated in a main capacitor for ~~stroboscope~~ strobo unit emission provided inside or outside, or discharges the piezoelectric element, and the control means controls the switching means for controlling the charging and discharging sequence of the piezoelectric element, and also controls to stop the charging

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operation when the piezoelectric element reaches a specified voltage, whereas the switching means includes a charging switch circuit for turning on or off charging of the piezoelectric element, a discharging switch circuit for turning on or off discharging of the piezoelectric element, and a detecting circuit for detecting the charged voltage in the piezoelectric element, and the control means controls to turn on or off the charging switch circuit on the basis of the detected voltage of the detecting circuit, and to take a first image in a state not displacing the imaging device, and take a second image by charging the piezoelectric element in a state of displacing the imaging device, and therefore the piezoelectric element can be operated without particularly preparing boosting circuit in the digital camera, and also an image of high definition can be obtained. Moreover, since the charging end is controlled by the control means, the switching means is realized in a smaller circuit structure.
